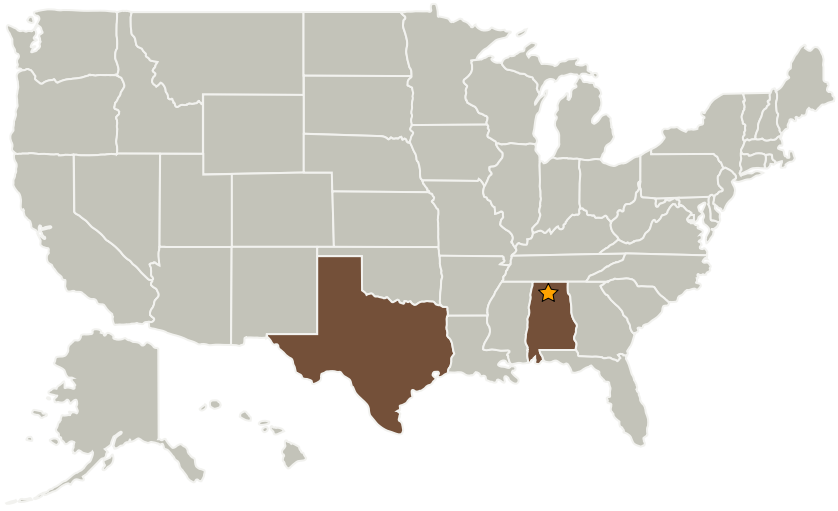
Laser Assisted Machining of Metal Matrix Composites, Phase I

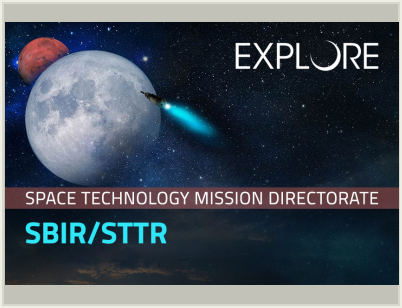
Completed Technology Project (2008 - 2009)

Project Introduction

Metal matrix composites (MMC's) are of great interest in aerospace applications where their high specific strength provides a weight saving alternative to standard materials. To date however their use has been limited by the difficulty in fabricating complex shapes. Most current methods for manufacturing MMC's are limited to relatively simple shapes that often still require further machining. It is the machining of MMC's that is the biggest drawback to their application. Grinding or single point diamond turning are generally the methods of choice but in each case tool wear is excessive and surface damage is apparent. A very attractive alternative for rapid machining of MMC's is Laser Assisted Machining (LAM). LAM has been successfully applied to ceramics and some recent work has indicated that LAM can successfully machine MMC's with high material removal rates and no surface damage. In this proposal, Nanohmics Inc. and Dr. Y. C. Shin of Purdue University propose to apply the recently developed technique of laser assisted machining coupled with a specially designed dynamic tooling system to develop a means of machining MMC's into complex shapes.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Nanohmics, Inc.	Supporting Organization	Industry	Austin, Texas

Primary U.S. Work Locations	
Alabama	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Mike Durrett

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.4 Manufacturing
    - TX12.4.1 Manufacturing Processes